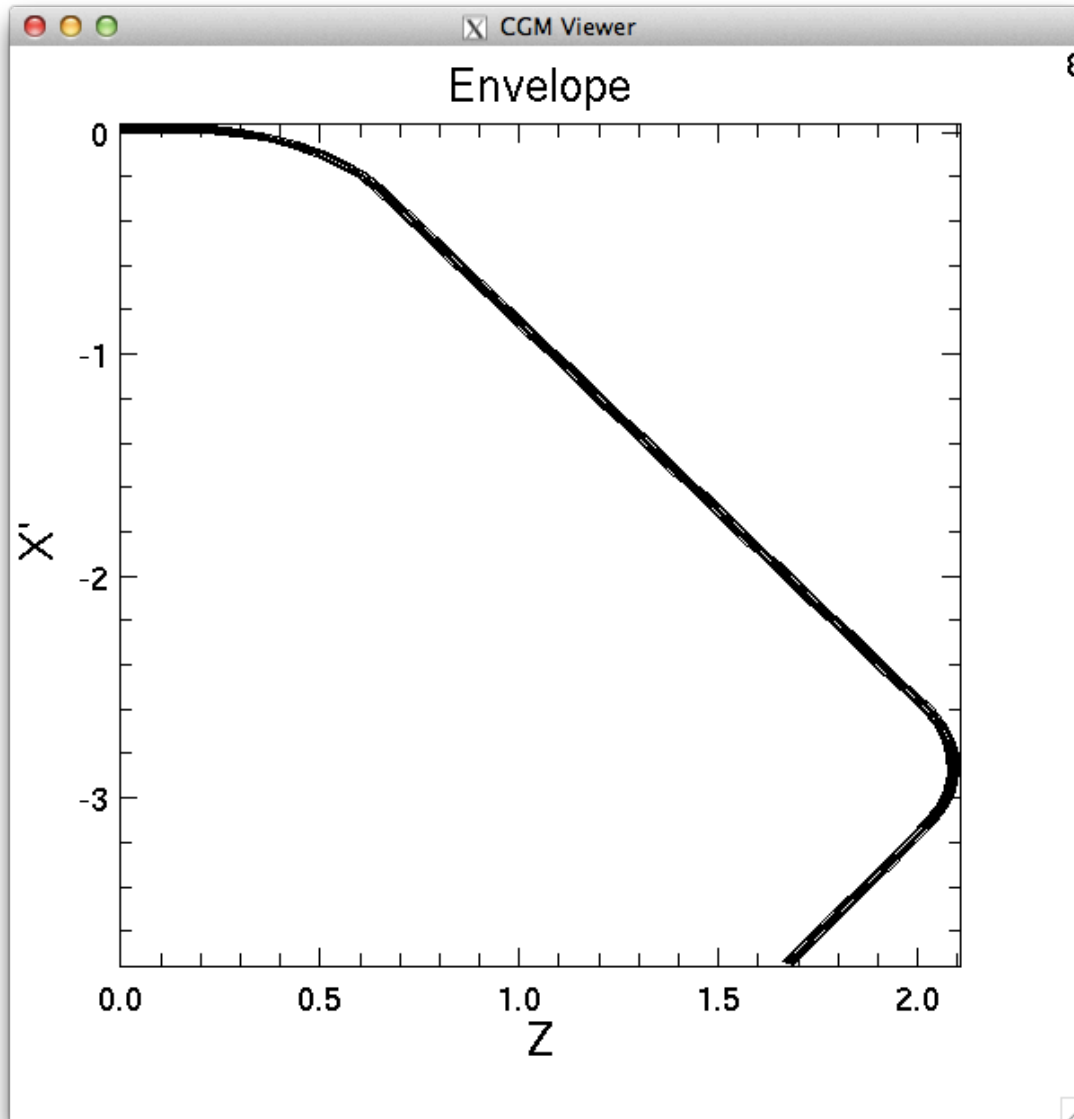


# WARP Simulations Update

## Topics:

- What has been done?
  - Particle Extraction
  - Fast particle mover
  - Linear setup
- Problems
  - Over bending in turn
- To be done
  - Bend correction
  - Windows
  - Decision of which data to extract
  - Restart procedure guide

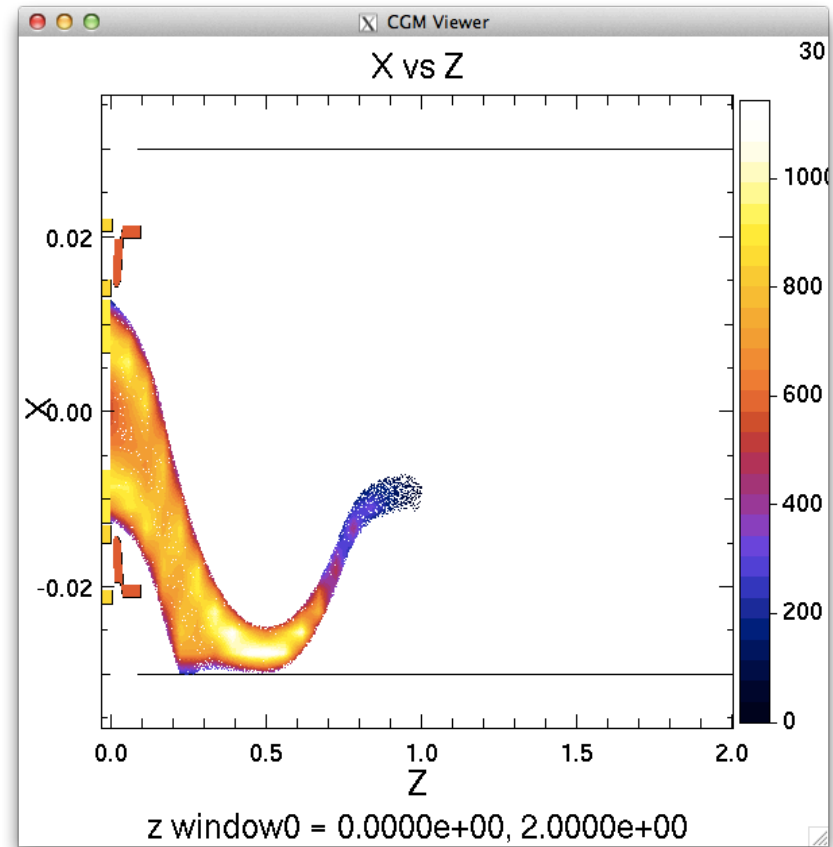
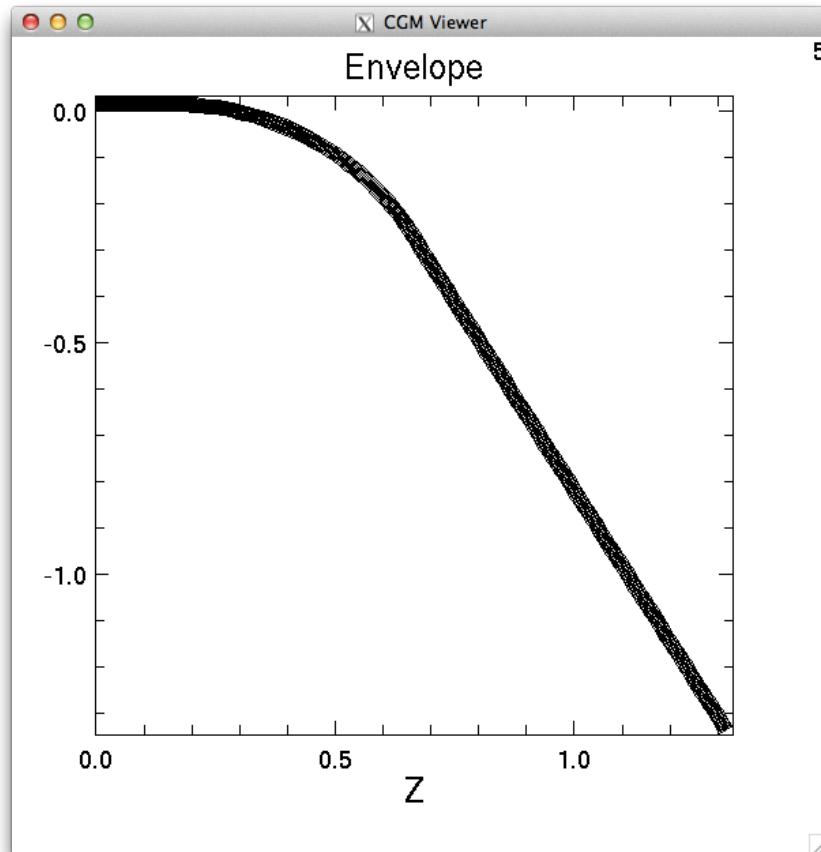
# TEL2 setup



- 58 degrees bends
- 3 solenoids in bends
- New syslength 4.68m

Bend only changes  
lattice if top.diposet  
correct

# Last stance



# Particle Extraction



```
ff = open('../Results/'+date+'/' + machine_type + "_" + date + time + "_" + machine_injtype + "_"
for x,y,z in zip(elec.xp,elec.y,elec.zp):
    ff.write('%10.5e %10.5e %10.5e\n' % (x,y,z))
ff.close()
```

```
-4.54500e-03 -3.22979e-04 8.06582e-01
-4.42538e-03 1.93889e-04 8.13448e-01
-2.13564e-03 -1.55605e-03 8.18921e-01
-1.29435e-03 4.38253e-03 8.12829e-01
1.09309e-03 3.85043e-03 8.03248e-01
4.01146e-04 3.29278e-03 8.09187e-01
-3.18338e-03 2.63025e-03 7.95063e-01
-2.97816e-03 3.27426e-04 8.05531e-01
-2.01161e-03 3.17372e-03 7.96941e-01
2.52062e-03 -1.51351e-03 7.87003e-01
3.25490e-03 2.31885e-03 8.13778e-01
3.00286e-03 -3.54183e-04 8.21280e-01
1.24874e-03 4.43413e-03 8.04818e-01
3.96843e-03 -2.53364e-03 7.90577e-01
-4.14083e-03 8.89589e-04 7.88022e-01
4.62878e-03 -1.04087e-03 7.95404e-01
-8.10376e-04 -4.61573e-03 8.04386e-01
1.49405e-03 2.23602e-03 8.06901e-01
1.34445e-03 -4.56397e-03 7.86045e-01
-3.37691e-03 -1.38237e-03 7.84744e-01
6.65413e-04 4.31493e-03 8.03937e-01
-4.00888e-03 2.20711e-03 7.79282e-01
-1.84683e-04 -3.50622e-03 7.95981e-01
2.84964e-03 -2.46679e-03 7.98196e-01
2.63604e-03 -1.39633e-03 7.94660e-01
3.08474e-04 -3.77889e-03 8.03647e-01
3.10510e-03 2.10431e-03 7.94205e-01
3.97100e-03 -2.36444e-03 7.96436e-01
-4.28847e-03 -7.42585e-03 6.32075e-01
-2.20044e-03 -2.23189e-03 7.87106e-01
-3.17220e-03 3.47428e-03 7.81193e-01
-4.04049e-03 -2.10674e-03 8.02259e-01
3.30425e-03 1.40719e-04 8.07658e-01
-6.66477e-04 -3.92528e-03 7.95052e-01
-1.10778e-03 -3.04692e-03 7.82349e-01
3.83229e-03 2.60152e-03 8.11001e-01
1.80647e-03 -2.10167e-03 7.96985e-01
-2.30871e-03 -3.84377e-03 8.18069e-01
-3.11293e-04 4.68476e-03 7.91932e-01
-2.39132e-03 -7.85925e-03 6.39671e-01
-3.67565e-03 2.43354e-03 7.74191e-01
-3.06029e-03 -8.15356e-04 7.98044e-01
4.24188e-03 1.86403e-03 8.03631e-01
2.23096e-03 4.03463e-03 8.11527e-01
1.15403e-04 6.04984e-03 6.24550e-01
```

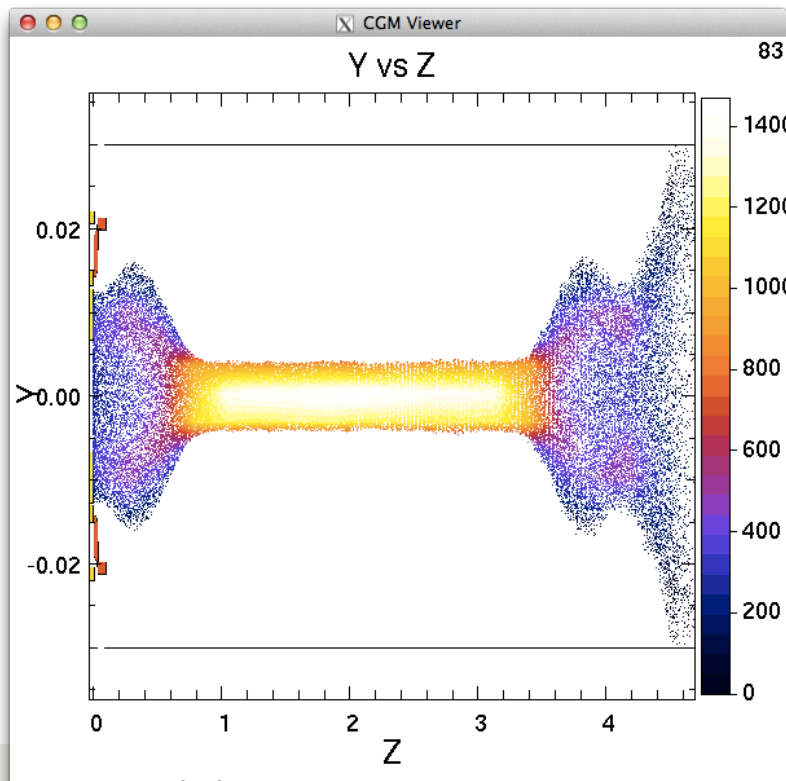
- Cleanup necessary – Text information
- File size = 120 kb
- List of all extractable information necessary
- Plottable in other tools (3D Plots?)

# Fast Particle Mover

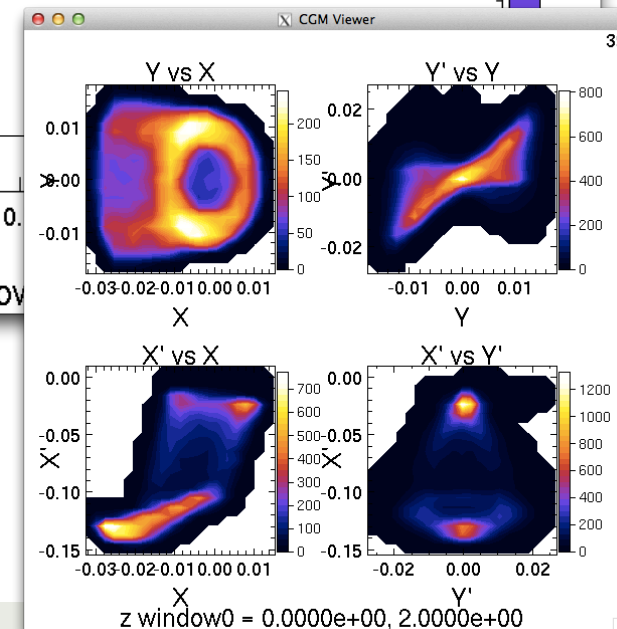
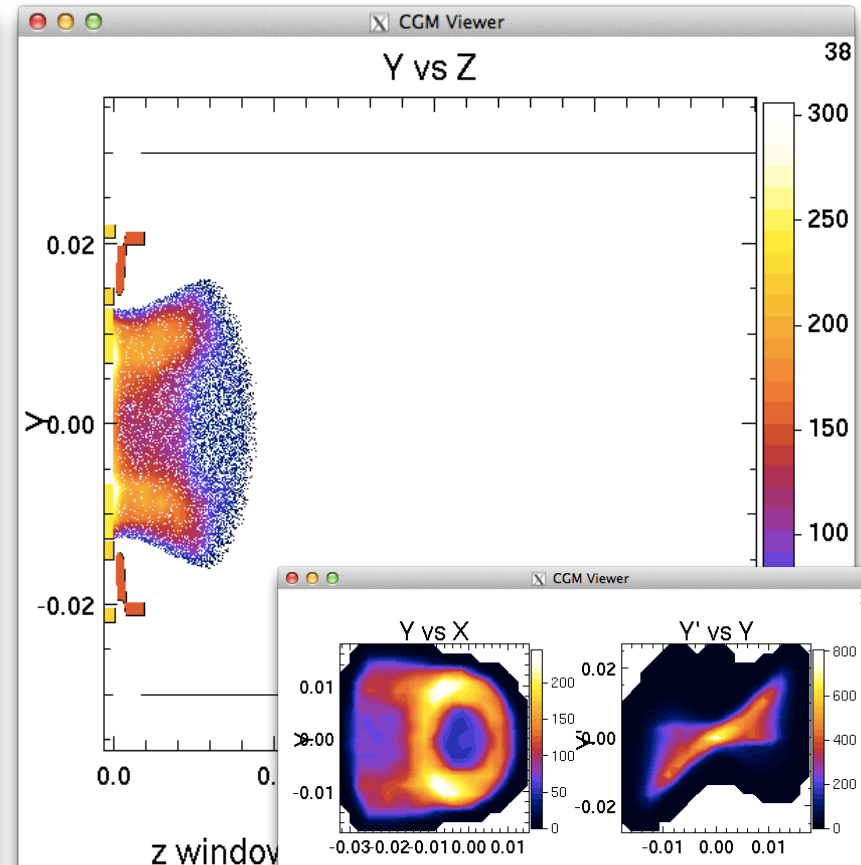
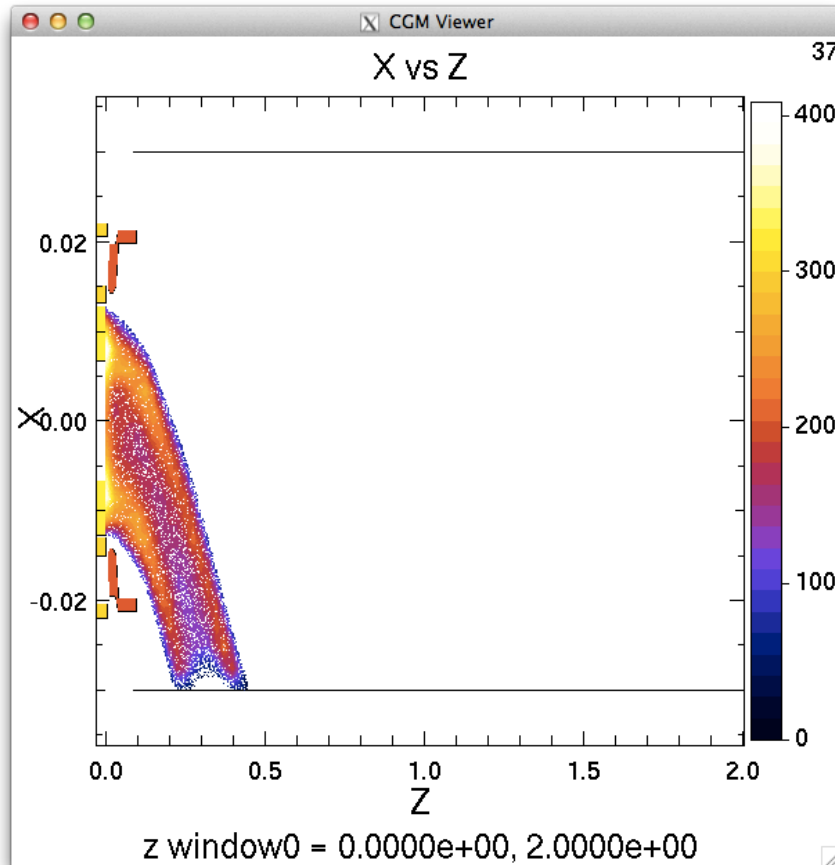


```
w3d.interpdk[1]=1
w3d.igradb=1
from loadgradb import setbsqgrad
setbsqgrad(w3d.nx,w3d.ny,w3d.nz,w3d.xmin,w3d.xmax,w3d.ymin,w3d.ymax,w3d.zmin,w3d.zmax)
```

- At least 50 times less timesteps -
- Can simulate 1.5 m on my local desktop at LHC magnet settings
- Install WARP on vdisk 1 -> 100%?

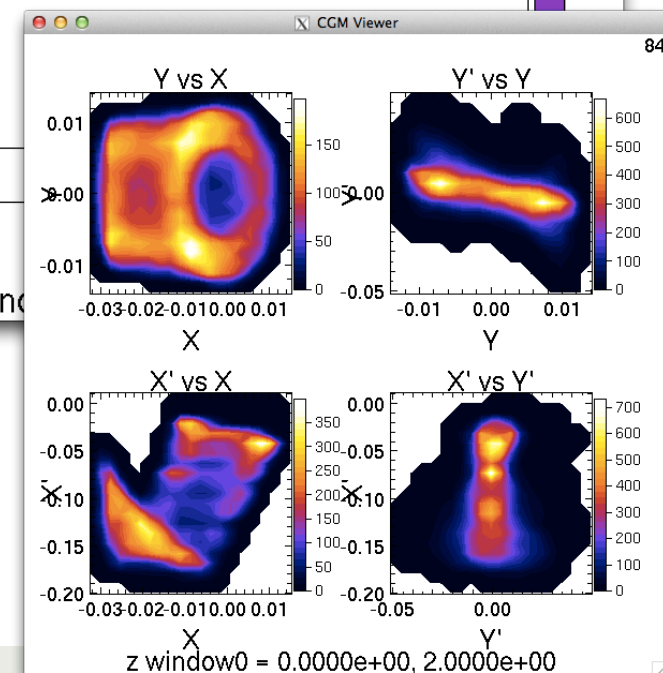
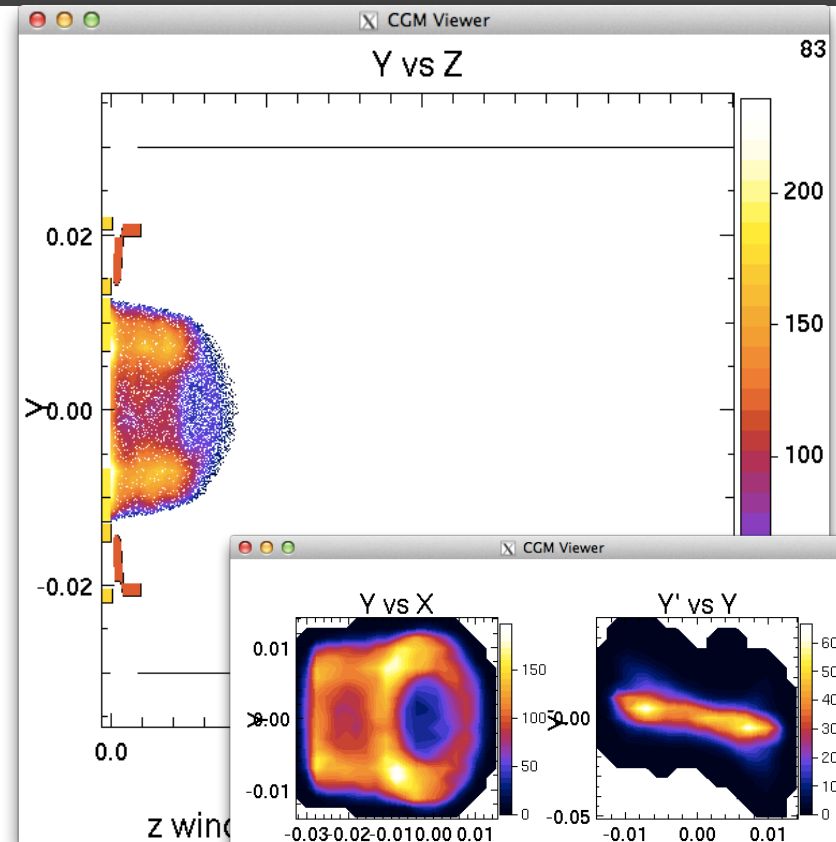
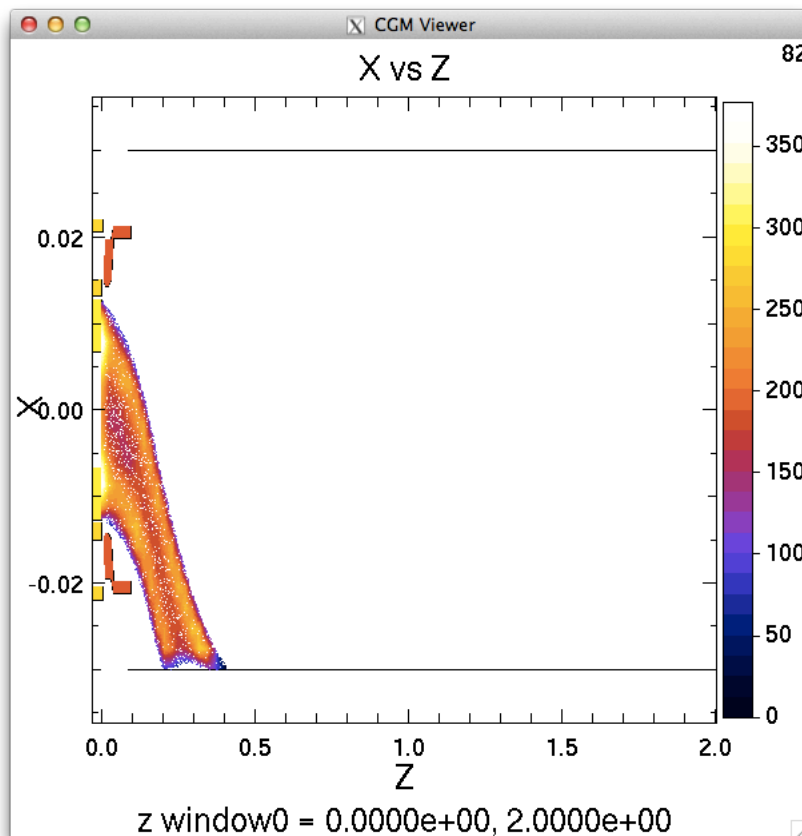


# Bend issues – TEL2 settings



Settings:  
 $B_{\text{main}}=5$ ,  $B_{\text{coll}}=0.43$ ,  $B_{\text{bend}}=B_{\text{coll}}/9.35$   
 Cathode Voltage: 500V

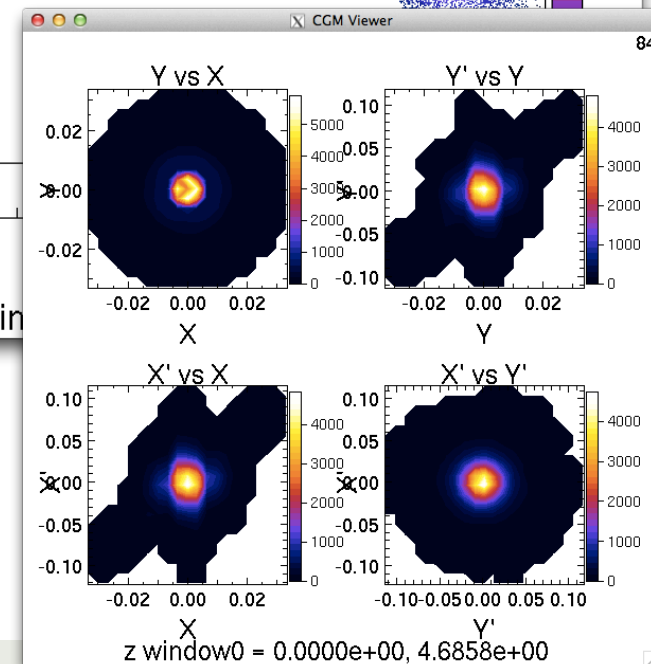
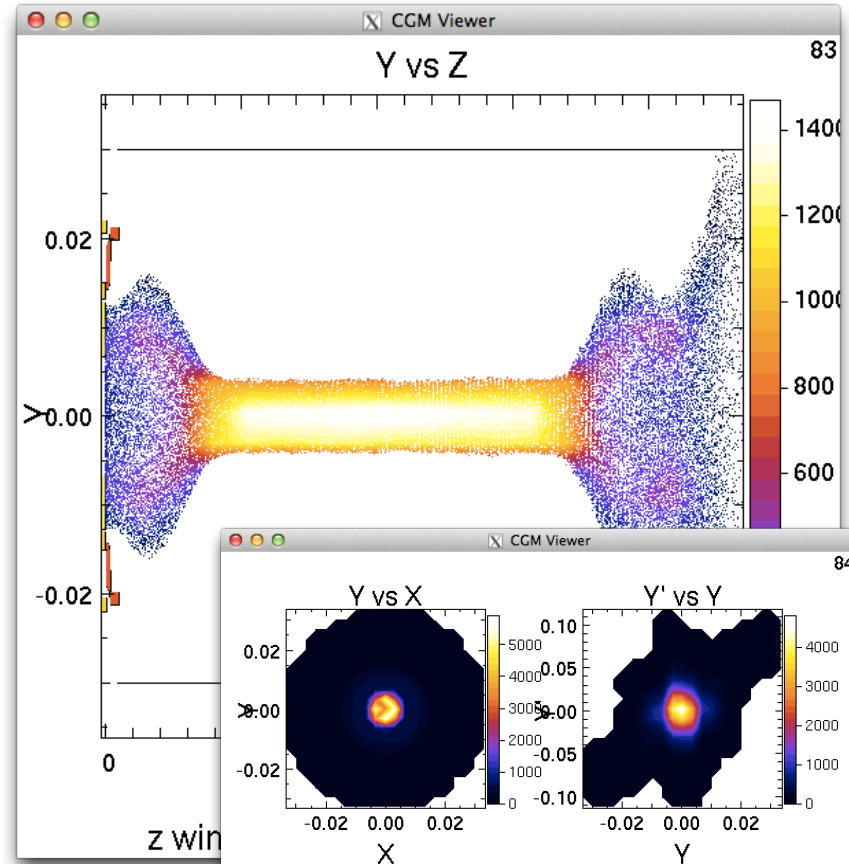
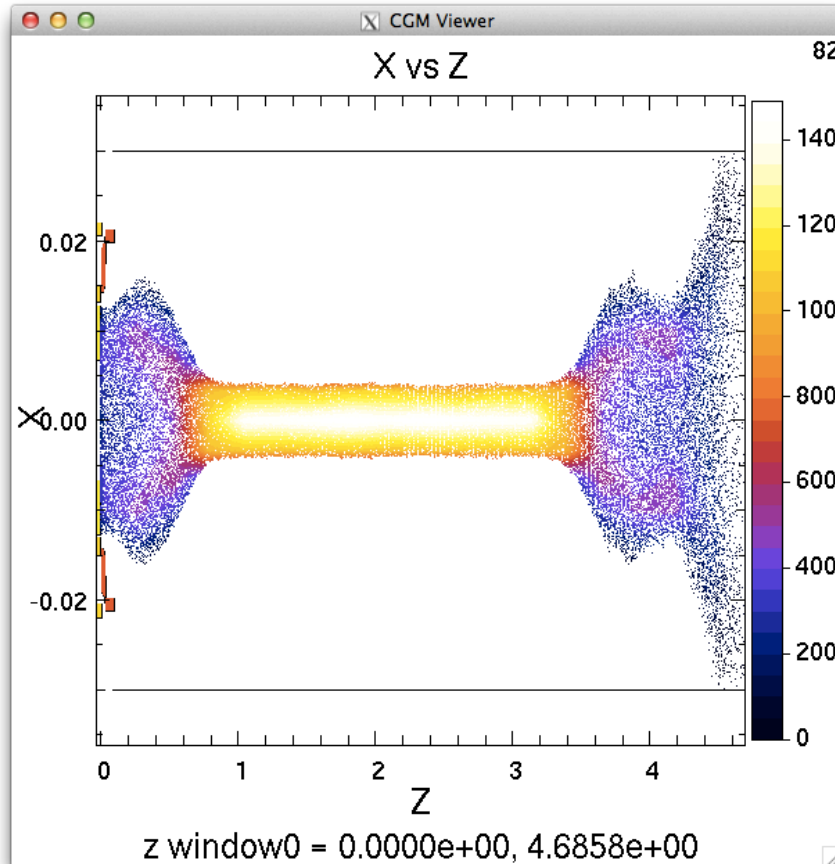
# Bend issues – TEL2 settings



Settings:  
 $B_{\text{main}}=5$ ,  $B_{\text{coll}}=0.43$ ,  $B_{\text{bend}}=B_{\text{coll}}$   
 Cathode Voltage: 500V

What to do about bends?

# Linear TEL2 setup



Settings:  
 $B_{\text{main}}=5$ ,  $B_{\text{coll}}=0.43$ ,  $B_{\text{bend}}=B_{\text{coll}}$   
 Cathode Voltage: 500V

Is the whole good enough?



# Next steps

- Install WARP on vdisk1 and check if powerfull enough
- Figure out bend issues -> Plot magnetic field along simulation
- Implement window and plot limits for center of interaction region to study hole
- Write dump & restart instructions
- Plot particle export data
- Run a set of sample simulations for LHC, TEL2 and tbench parameters. -> focus on gun injection
- ADMIN rights on vdisk1?

